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EXAMINER

KAL INCHAK, S

ART UNIT PAPER NUMBER

1103

14

DATE MAILED: 08/27/92

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

This application has been examined Responsive to communication filed on 5/18/92 This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

- Notice of References Cited by Examiner, PTO-892.
- Notice re Patent Drawing, PTO-948.
- Notice of Art Cited by Applicant, PTO-1449.
- Notice of Informal Patent Application, Form PTO-152.
- Information on How to Effect Drawing Changes, PTO-1474.
- _____

Part II SUMMARY OF ACTION

1. Claims 45-95 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. Claims 1-44 have been cancelled.

3. Claims _____ are allowed.

4. Claims 45-95 are rejected.

5. Claims _____ are objected to.

6. Claims _____ are subject to restriction or election requirement.

7. This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. Formal drawings are required in response to this Office action.

9. The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are acceptable. not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. The proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been approved by the examiner. disapproved by the examiner (see explanation).

11. The proposed drawing correction, filed on _____, has been approved. disapproved (see explanation).

12. Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has been received not been received been filed in parent application, serial no. _____; filed on _____

13. Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. Other _____

EXAMINER'S ACTION

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The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

This Office Action contains a non-final rejection due to the new grounds of rejection made in view of the Buseck et al. article.

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification is objected to under 35 U.S.C. § 112, first paragraph, as the specification, as originally filed, does not provide support for the invention as is now claimed. Specifically, support is not found for the new limitation of claim 86 that C_{60} be present in "measurable quantities". Pages 3-5 and Examples 1-3 have been reviewed and the phrase is not used therein, nor is any measuring step described. The use of mass spectroscopy in Example 3 is noted as is the fact that the prior art of record, (e.g. Kroto et al., Gerhardt et al., and Buseck et al.) also measures fullerenes present by mass spectroscopy.

Claim 86 is rejected under 35 U.S.C. § 112, first paragraph, for the reasons set forth in the objection to the specification.

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Claim 86 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "measurable quantities" is indefinite as it is not clear what quantities Applicants consider measurable.

35 U.S.C. § 101 reads as follows:

"Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title".

Claims 45-83, 86-88 and 91-93 are rejected under 35 U.S.C. § 101 because the invention as claimed embraces products found in nature as shown by the Buseck et al. article. As set forth by the Commissioner of Patents and Trademarks, Official Gazette, 1077 O.G. 24 (1987):

Products found in nature will not be considered to be patentable subject matter under 35 USC 101 and/or 102. An article of manufacture or composition of matter occurring in nature will not be considered patentable unless given a new form, quality, properties or combination not present in the original article existing in nature in accordance with existing law. See e.g. Funk Bros Seed Co. v. Kalo Inoculant Co., 333 U.S. 127, 76 USPQ 280 (1948); American Fruit Growers v. Brogdex, 283 U.S. 1, 8 USPQ 131 (1931); Ex parte Grayson, 51 USPQ 413 (Bd. App. 1941).

Claims 45-95 are rejected under 35 U.S.C. § 101 because the product claims to pure C₆₀, C₇₀, etc. are not supported by an enabling disclosure for any use of the material as of the filing date of the instant application. The entire disclosure describes

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all of the suggested utilities as speculative "might be" utilities. C_{60} , C_{70} , etc. carbon has an entirely different structure than graphite there is no reason of record to believe it has the same lubricating properties as graphite. Similarly the reaction to form a $C_{60}F_{60}$, $C_{70}F_{70}$, etc. molecules has not been enabled either with respect to both how to make the compounds or the utilities for same. The model, nucleus and catalyst, utilities suggest no reaction how to make any of the materials nor a single specific end use. Although other utilities may now have been discovered since the filing date of the instant disclosure they do not support the utilities alleged in the instant application. If applicants can show that any of proposed utilities was enabled as of the instant filing date the rejection will be withdrawn.

Claims 45-83, 86-88, and 91-93 are rejected under 35 U.S.C. § 102(b) as being anticipated by the natural deposit of shungite found near the town of Karelia, Russia with the Buseck et al. article cited to show an inherent state of fact.

The reasoning of this rejection is the same as in the rejection made under 35 USC 101, supra. The Examiner recognizes that the date of the Buseck et al. article is after the instant filing date. However, the Buseck et al. article is not applied as prior art in this rejection, but only to show the inherent fact that C_{60} and C_{70} as instantly claimed occurs in nature. As

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to the "consisting essentially of" language of claims 45-47, the burden is on Applicants to show that the added materials of the natural deposit are contrary and inimicable to the instant invention in terms of utility.

Claims 45-84, 86-89 and 91-93 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over the Kroto et al. article in Nature, Vol. 318, 162, November 14, 1985 with the Curl et al. article in Scientific American, October 1991 page 54 cited to show an inherent state of fact.

As discussed in the Nature article, Kroto et al. detected C₆₀ and C₇₀ fullerenes in soot produced by the laser evaporation of graphite. The C₆₀ and C₇₀ were detected or "measured" by means of time of flight mass spectrometry, and the amount of C₆₀ and C₇₀ molecules produced was on the order of tens of thousands (see the Curl et al. article in Scientific American, October 1991, pg. 54, third column). The Examiner notes that the detection method used by Kroto et al. detected the C₆₀ and C₇₀ in the vapor state, thereby anticipating the instant claims 82, 86, 87 and 91.

The instant claims 48-51, 75, 78, 81, 83, 88 and 91-93 require that the C₆₀ or C₇₀ be incorporated into a solid matrix. The disclosure of Kroto et al. inherently meets this requirement as solid particulate of free flowing soot is "formed" in the

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evaporation chamber. Given the well known stability of the fullerenes produced it is inherent that the fullerenes not directed to the mass spectrometer are inherently incorporated into the soot mixture, which is either amorphous or crystalline. Thus the instant claims are anticipated in this respect. Also, the limitation that the product be formed and extended in at least one direction is noted. This is not seen to distinguish the instant product because the limitation reads on any particle that has a definite size. As to the "consisting essentially of" language of claims 45-47, the burden is on Applicants to show that the added component of the solid product of Kroto et al., i.e. soot, is contrary and inimicable to the instant invention in terms of utility.

The instant claims 52, 73, 74, 76 and 79 are directly anticipated by the teaching of Kroto et al.. Note that immediately after the graphite is vaporized, the helium atmosphere in the apparatus of Kroto et al. contains a carbon product that comprises a mixture of C_{60} and C_{70} . Regarding the instant claims that define the properties of C_{60} and C_{70} fullerenes such as the mass spectra, infrared spectra, UV spectra, solubilities, sublimation temperatures and color, the Examiner notes that these are all inherent properties of the C_{60} and C_{70} molecules produced and detected by Kroto et al. which have subsequently been confirmed in the art. It is also noted

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that the C_{60} and C_{70} of Kroto et al. is "formed" as the graphite is vaporized, thereby anticipating the instant claims 73 and 80. Regarding the instant limitations in claims 84 and 89 that the fullerenes be "substantially pure", as shown in Fig. 3 of the reference detection peaks for C_{60} and C_{70} are fully separated from other peaks thus indicating that the instrument has isolated the C_{60} and C_{70} from other substances in the matrix thus indicating that the two are "pure" or "substantially pure".

As to the instant product by process claims, for the reasons discussed above the C_{60} and C_{70} products of Kroto et al. are identical or only slightly different from that claimed. Thus the instant product by process claims are rendered *prima facie* obvious by the teaching of Kroto et al. See MPEP 706.03(e).

Claims 45-84, 86-89 and 91-95 are rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103 as obvious over the carbon produced in partial flame combustion processes such as those described in the Kirk-Othmer text with the Gerhardt et al. article, the Howard et al article and the Curl et al. article in Scientific American, October 1991 page 63 cited to show an inherent state of fact.

The Kirk-Othmer text describes two well known methods of producing carbon black and/or soot --- an acetylene black process and a channel black process. Both methods comprise the steps of collecting the carbon product produced by sooting flames (pgs.

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652-653). The Gerhardt et al. article, the Howard et al. article, and the Curl et al. article in Scientific American October 1991 (pg. 63) are cited as evidence that C_{60} and C_{70} fullerenes are inherently produced in the carbon black processes described by the Kirk-Othmer text. The specific limitations of the instant claims are met by the fullerenes produced in carbon black process for the reasons set forth in the above art rejection based on the Kroto et al. article.

Applicant's arguments filed May 18, 1992 have been fully considered but they are not deemed to be persuasive.

Applicants refer to the fact that Kroto et al. only had indirect or circumstantial evidence of fullerenes. This argument is not persuasive because there is not evidence of record indicating that Kroto et al. were in fact wrong in concluding that fullerenes were produced. While Applicants' attorney cites several reasons as to why Kroto et al. "may" have been wrong in their conclusion (see response, pages 14-15), the Examiner takes Official Notice that Applicants have published several articles pertaining to C_{60} and C_{70} which cite the Kroto et al article and have never taken issue with the conclusion that C_{60} and C_{70} were in fact produced by Kroto et al. If Applicants are now asserting that Kroto et al. were wrong in the conclusion that fullerenes were produced in 1985, it must be clearly stated on the record citing evidence in support. In the absence of such a statement

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with evidence submitted in support, the Kroto et al. article is deemed to accurately teach and enable the production of tens of thousands of C₆₀ and C₇₀ molecules. At this point it is noted that there is no limitation in the instant claims distinguishing the quantities of C₆₀ and C₇₀ produced by Kroto et al. from that of the instant claims.

Applicants' reliance on In re Wiggins, 179 USPQ 421 (CCPA 1973) and reacDatascope Corp. v. SMEC Inc., 224 USPQ 694, 698 (D.N.J. 1984), a'ffd in part, rev'd in part, 227 USPQ 838, 840-841 (CAFC 1985) is not persuasive. In re Wiggins is distinguished from the instant case in that the allegedly anticipatory reference merely named the claimed compound without describing how it is to be made. In contrast, the Kroto et al. article describes C₆₀ and C₇₀ and details a process that enables one of ordinary skill in the art to make trace quantities of C₆₀ and C₇₀. Datascope Corp. is distinguished from the instant situation in that the allegedly anticipatory reference lacked an express disclosure of a claimed element and the infringing party presented a conjectural argument that the claimed argument was implied by the drawings. In the instant case however, Kroto et al. expressly conclude that C₆₀ and C₇₀ were produced.

Applicants assertion that Kroto et al. only detected molecular ions of C₆₀ and C₇₀ is not persuasive as there is no limitation in the instant claims that limits the instant to non-

ionic species of fullerenes. Applicants also argue that Kroto et al. only made microscopic levels, i.e. tens of thousands of fullerene molecules. However the instant claims embrace trace quantities of C₆₀ and C₇₀. There is no limitation in the instant claims to distinguish the quantities produced by Kroto et al. from that of the present invention. As to the instant claim 86 where C₆₀ in "measurable quantities" is recited, no distinction is seen between the amount measured by mass spectroscopy in the reference and the amount considered "measurable" in the instant claim. Applicants also offer the conclusory argument that Kroto et al never made crystalline or solid C₆₀ and C₇₀ (see Response, page 12). However such a statement by itself does not overcome the inherent fact that those fullerenes produced but not directed to the mass spectrometer in the reference condense and become part of the soot mixture. This inherent fact is fully expected due to the well known stability of C₆₀ and C₇₀. The fact that Kroto et al. did not extract enough fullerenes to produce a colored solution is not persuasive as the instant claims read on trace quantities of C₆₀ and C₇₀.

As to the rejection made over the Kirk-Othmer text, the Examiner notes that the Gerhardt et al., Howard et al., and Curl et al. articles are cited to show an state of fact inherently present in the Kirk-Othmer text. Thus the only publication date relevant under 35 USC 102 in this instance is that of Kirk-

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Othmer. The references are not being "combined" under 35 USC 103, and thus a suggestion or motivation to do so is not needed. The thread linking these references together is the fact that they all pertain to collecting the products of sooting combustion flames. As to the issue of enablement, the Kirk-Othmer text enables the use of sooting combustion flames to produce a carbon product that inherently comprises C₆₀ and C₇₀. Evidence of this inherency is provided by the Gerhardt et al., Howard et al., and Curl et al. articles. These articles are deemed to accurately teach what is stated for the same reasons discussed regarding the Kroto et al. article.

Finally, Applicants discuss the long felt demand to isolate certain quantities of C₆₀ and C₇₀. This secondary consideration is not persuasive as there is no claim of record that recites a minimum quantity of isolated or substantially pure C₆₀ and C₇₀.

Applicants' Information Disclosure Statement filed August 17, 1992 has not been considered as the certification referred to in the disclosure statement has not been received. The matter is moot because the reference disclosed was previously discovered and applied by the Examiner.

Any inquiry concerning this communication should be directed to Stephen Kalinchak at telephone number (703) 308-1093.

Serial No. 580,246

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SGK

S. Kalinchak/rw
August 27, 1992

Michael L. Lewis

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